

A monitoring and evaluation framework for transformative change from sustainability programs in secondary schools

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Abstract

Change for sustainability occurs through systemic and transformational processes. In an educational context, 'transformation' is dependent upon interactions between the school and its stakeholders. In this paper, the authors being to develop a monitoring and evaluation framework towards informing transformative change programs, developing effective education for sustainability initiatives, and predicting their potential for success or lack there of. This research is timely as providing education for sustainability has recently been endorsed as an imperative in all states and territories of Australia, guided by the document *Educating for a Sustainable Future – A National Environmental Education Statement for Australian Schools*. It also coincides with the United Nations Decade of Education for Sustainable Development (UNDESD) 2005-2014. In exploring relevant systemic and transformational processes, the authors examine a range of drivers that influence the design, delivery and uptake of schools-based education for sustainability including the document *Educating for a Sustainable Future* and the *National Action Plan in Education for Sustainability (NAP ESD)*. Analysis of drivers indicates that transformative change for sustainability can be attained through: 1) preparing both teachers and students for change; 2) empowering teachers and students to build their capacity for self-driven action for transformational change; and, 3) developing a systemic monitoring and evaluation framework that enables students' and teachers' learning outcomes to be evaluated and extended. In the process of developing the monitoring and evaluation framework, the authors introduce the concept of an Ecolect (Eco^l); a person's tested and measured understanding of ecological, economic, social, and political sustainability factors, the interactions between these factors, and capacity for transformative change for sustainability.

Introduction

It is increasingly being recognised that a shift in practice within the school educational sector requires the adoption of whole-school approaches to sustainability (Department of the Environment and Heritage, 2006; Gough & Sharpley, 2005; Henderson & Tilbury, 2004; Tilbury, Coleman & Garlick, 2005; UNESCO, 2005). As highlighted by Potter, 2007 this shift moves beyond the dissemination of knowledge and understanding about the environment, to equipping individuals with the skills and motivation needed to work

toward a more sustainable world (Gough & Sharpley, 2005; Tilbury, 2005; Tilbury & Cooke, 2005). Recognising that a school is a “learning community”, this implementation of education for sustainability incorporates all elements of school life: school governance; resource management; school grounds and physical surrounds; networks and partnerships; curriculum; and teaching and learning practices (Gough & Sharpley, 2005; Henderson & Tilbury, 2004; Tilbury, Coleman & Garlick, 2005).

Past emphasis has been upon developing environmental education-based learning experiences that can be ‘tacked on’ to existing curriculum in order to provide a ‘green’ glow to the program. Similarly, sustainability was first introduced and taught as a sub-section of environmental education (Cutter-Mackenzie and Smith, 2003). As Cutter-Mackenzie and Smith (2003) highlight, ‘environmental educators often maintain that school education should endeavor to improve and protect the environment through producing an environmentally informed, committed and active citizenry, yet existing research shows that the implementation of environmental education in schools is problematic and has had limited success’. Consequently, there has been a recent shift towards a more holistic view of sustainability education such that students can be significant drivers of future systems of change. However, the more holistic approach encompassed by education for sustainability (EfS) is yet to have the significant impact upon school governance that environmental education has enjoyed. Research indicates that this may be because the current implementation of EfS does not differ significantly from environmental education with little attention paid to the cultural, political, social and economic aspects of sustainability and how these are interconnected. The following comments of Davis and Cook (2007) suggest that an appropriate goal for EfS is to develop more holistic and systemic education models that extend the scope of EfS and improve the quality and frequency of sustainability outcomes resulting from such education:

While not the complete answer, education must be a part of imagining and transforming our patterns of living. Learning embedded in educational systems derived from worldviews that replicate unhealthy and unsustainable lifestyles and environments is not a part of the solution but a significant part of the problem.

The process of change in schools can often be slow moving, fragmented, and ineffective. Baker (2003) contends that such inertia arises from the bureaucratic and well-established nature of many school structures:

...school systems being, not unlike large, established organizations, so transfixed with their internal systems and bureaucracies they are unable to change (Kelleher and Levenson, 2004).

Building on Baker's observations, Kelleher and Levenson (2004) have questioned 'whether, and under what conditions, school and school district culture can really change'. Certainly, authentic processes of transformative change go beyond traditional environmentalism and environmental education. They include complex social, ecological, economic, spiritual, and political processes that encompass classroom dynamics, decision-making processes, organisational structures, leadership strategies, strategic planning initiatives and collaboratively envisioning the future (Moore, 2005). It is this holistic, system-wide perspective that is required in order for transformative change for sustainability to gain traction in Australian secondary schools.

Unpacking the Drivers

The monitoring and evaluation framework (MEF) developed for transformative change towards sustainability is grounded in current and emerging national and international sustainability drivers. Indeed, providing education for sustainability has recently been endorsed as an imperative in all states and territories of Australia and is guided by the 'National Action Plan' documents '*Educating for a Sustainable Future*', and, the emerging '*Education for Sustainable Development*' (NAP ESD) - the latter having been developed to supersede the preceding document. Cognizant of the recent imperatives and drivers, the monitoring and evaluation framework seeks to address the recognised gap between knowledge and behaviour change for sustainability teaching in Australia.

In developing the Monitoring and Evaluation Framework (MEF), we begin by defining the underpinning values within which the framework will be developed to ensure that these are consistent with overarching sustainability objectives and the objectives recently developed for education in Queensland. Specifically, we advise an approach that encourages active and informed citizens for a sustainable world. These values are consistent with the *Queensland Education Department's Strategic Plan 2007–2011* and *Education for Sustainable Futures: Schooling for the Smart State* policy documents. Thus, the MEF we develop incorporates the core principles within these documents to qualify the learning pathways students and teachers embark upon in order to achieve key outcomes. These core principles include:

- Ecological awareness;
- Integrity in service/stewardship;
- Accountability and environmental sustainability; and
- Professionalism in performance.

In addition to State objectives we also draw upon national policy and the National Action Plan for EfS in particular, '*Educating for a Sustainable Future – A National Environmental Education Statement for Australian Schools*' (Australian Government, Department of the Environment and Heritage, 2006). This provides a nationally agreed description of the nature and purpose of environmental

education for sustainability through all years of schooling, including a vision and a framework for its implementation. It is intended for teachers, schools and their communities, education systems and developers of curriculum materials. It is also intended as a companion to existing State and Territory policies and programs.

'Educating for a Sustainable Future' was developed collaboratively with significant input from government and non-government organisations and endorsed by all Australian and State/Territory Ministers for Education through the Ministerial Council on Employment, Education, Training and Youth Affairs (MCEETYA) in May 2005. The subsequent release of the document to all Australian schools in November 2005 coincided with the first year of the United Nations Decade of Education for Sustainable Development (UNDESD) 2005-2014; a global call to all countries to strengthen their contribution to sustainable development through a focus on education.

The existing plan has led to the implementation of a broad range of initiatives, including establishment of the National Environmental Education Council (NEEC), the National Environmental Education Network (NEEN), the Australian Research Institute in Education for Sustainability (ARIES) and the development of programmes such as the Australian Sustainable Schools Initiative (AUSSI).

Ensuring that the MEF proposed draws upon lessons inherent within the existing national action plan (*NAP EE*) and is consistent with the emerging *National Action Plan in Education for Sustainability (NAP ESD)* ensures that the MEF developed will build upon existing experience and future intentions. For example, the MEF will respond to the following guiding principles for educational design within the NAP ESD to ensure learning opportunities that:

- Engage people of all backgrounds in an ongoing process of learning;
- Enable people to develop new understandings of sustainability as well as make decisions and take actions that have positive impacts upon sustainability;
- Promote and achieve system-wide change;
- Embed lasting change across social, economic, political and ecological systems; and
- Support the implementation of ecologically sustainable development (ESD) at all levels.

Despite coinciding with the United Nations Decade of Education for Sustainable Development (UNDESD) 2005-2014, the *NAP EE*, and subsequent *NAP ESD*, are more importantly positioned to enact the UNDESD IIS (International Implementation Scheme) strategies for encouraging the forward movement of education for sustainable development. These strategies include:

- Vision-building and advocacy;

- Consultation and ownership;
- Partnership and networks;
- Capacity-building and training;
- Research and innovation;
- Use of Information and Communication Technologies (ICTs); and,
- Monitoring and evaluation.

As identified by Tilbury (2007):

The process of monitoring and assessment offers an opportunity to engage stakeholders in DESD activities, thus it can be more than just measuring performance. In their most conservative form, ESD (Education for Sustainable Development) monitoring and assessment frameworks help: 1) ensure on going relevance and effectiveness of ESD efforts; 2) guide planning and reorienting of DESD programs; 3) increase understanding of ESD progress; and, 4) improve decision making and action-taking during the decade.

Indicators have an inherent capacity to provide valuable information for all stakeholders in regards to the success and/or predicted success of EfS programs and initiatives. As highlighted by Tilbury (2007), 'the UNECE Expert Group defined ESD indicators as having the ability to point to an issue or condition. In particular, indicators are important as they can direct attention to a part of a system and/or system as a whole that is not always visible or easily measured (Eder, 2004).

Thus, the MEF developed in this paper is consistent with specific strategies detailed for the UNDESD IIS and has a goal of providing assistance in determining potential future directions or EfS programs and initiatives.

Gaining 'Action with Traction'

Despite the range of state, national, and international policies with regard to the overall aims and implementation of EfS, there remains little knowledge of what effective EFS looks like within Australian secondary schools. We present a MEF integral to informing transformative change for sustainability and the development of holistic education for sustainability initiatives. The MEF provides a platform upon which to assess and evaluate the development of EfS programs in quantitative and qualitative ways, in order to inform future initiatives and provide a catalyst for transformative change for sustainability in Australian secondary schools.

Processes of transformative change

The process of transformative change described below forms the basis for the MEF developed in this paper. It is based upon eleven steps for transformational change described by Dunphy et al., 2003 (Figure 1).

1. Knowing where your understanding of sustainability is at now;
2. Developing a holistic vision for sustainability;
3. Identifying gaps and key indicators;
4. Assessing readiness for transformative change;
5. Setting the scene for change;
6. Securing basic change and compliance first;
7. Moving beyond basic change to more advanced change;
8. Establishing the monitoring and evaluation of performance criteria;
9. Launching and managing the 'Transformative Change' System;
10. Maintaining and enhancing the momentum of the 'Change System'; and,
11. Reflecting on change in order to guide further systemic change.

Figure 1: Transformational Change Process

The steps described by Dunphy et al. (2003) form the structure of a constructivist approach to transformative change where each step informs the next and provides the grounding for successful progression through the transformative change process. Dunphy et al. suggested that 'implementing transformational change strategies involves radically changing the mindsets, cultures, structures and products of organisations to obtain sustainability outcomes' (Tilbury, Adams, and Keogh, 2005). The Authors have adapted the 'framework' of Dunphy et al. transformational change process to provide a strategy for change that, through a fundamental shift in educational culture, may lead to lasting change for sustainability in secondary schools. The MEF developed captures specific qualitative data relating to the initial steps one (1) through four (4) in the suggested transformative change process.

Monitoring and Evaluation Framework (MEF)

Education for Sustainability offers a 'global', 'systemic' and inter-disciplinary approach to education because it facilitates dealing with concrete real issues without simplifying them beforehand'. It also 'comprises school initiatives at three levels' (SEED, 2005);

- *Pedagogical* (by creating stimulating/meaningful learning experiences and involving students in sustainable ways of thinking, acting and feeling at school, in their families and communities);
- *Social/Organisational* (by building and cultivating a culture of communication and decision making and developing a positive social climate); and,
- *Technical/economic* (through ecologically sound and efficient use of resources).

The MEF for Transformative Change is a systemic tool developed to enable students and teachers learning outcomes to be evaluated and extended. The Goals of this framework are:

- To evaluate EfS programs;
- To review and refine the EFS Programs prior to wider distribution;
- To inform and set the stage for the development of further EFS and Sustainability-based curriculum; and,
- To increase the chance for transformative change resulting from the Programs development.

The framework focuses upon the stakeholder's interaction with EfS programs and their institutional context from different perspectives. It attempts to observe, collect, and assess data at the pedagogical level, with a focus upon context, structure, processes and outcomes relevant to achieving sustainability (Figure 2).

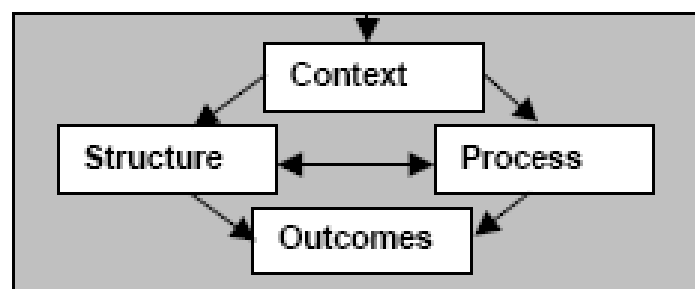


Figure 2: Monitoring and Evaluation Components (Bellamy et al., 2005)

Context (Framing or Characterisation of the problem):

- Teaching and Learning Conditions;
- Emerging Issue(s) – Environmental, Social/Cultural, Economic, and Political;
- Beliefs and Prior Understandings/experiences
 - *Pedagogical* (i.e. aim to create stimulating/meaningful learning experiences and involve students in sustainable ways of thinking, acting and feeling at school, in their families and communities);
 - *Social/Organisational* (i.e. aim at building and cultivating a culture of communication and decision making and developing a positive social climate); and,
 - *Technical/economic* (i.e. aim for an ecologically sound and economic use of resources).
- Positions on Education for Sustainability (i.e. current educational research and discourse; educational institutions underlying beliefs about EfS)
 - EfS Systems need to be flexible and adaptable to, for example, educational institution locations and resources; teaching styles; school ethos; and, student/teacher abilities.

Structure:

- Formal imperatives driving EfS initiative development;
- Legislative and policy directives;
- School operational plans;
- Formalised curriculum.

Processes:

- The activities, strategies and relationships that facilitate EfS;
- EfS implementation and delivery processes.

Outcomes:

- Actual EfS improvements;
- Outcomes that enable future EfS improvements.

Data for the Monitoring and Evaluation framework should be captured through:

- Reflections by the teachers on the process of building the EfS programs/units;
- Collection of data from students and teachers throughout the trial phase of the programs/units;
- Reflection on the programs/units progression and suggestions for refining;
- Observation by external observer ('critical friends'); and,
- Reporting on data collecting using a triangulation method built into the framework (Figure 3).

Monitoring and Evaluation Techniques Sequence	
(1) Pre-Test	
a. Student(s)	
b. Teacher(s)	
(2) Monitoring	
a. Observation by:	
i. Critical friend	
ii. Teacher(s)	
iii. Student(s)	
b. Observation of:	
i. Teacher(s)	
ii. Student(s)	
c. Interview	
i. Teacher	
1. Pre-implementation	
2. Post-implementation	
(3) Post-test	
a. Teacher(s)	
b. Student(s)	
(4) Triangulation of Data	

Figure 3: Sequence of Data Collection for the Monitoring and Evaluation Framework

The pre-implementation questionnaire will be utilised to assess the perceived outcomes that students and teachers believe will be achieved through interaction with the EfS program/unit. Observation will be conducted by both teachers and ‘critical friends’ throughout the program/units implementation to provide independent assessment of the programs successful accomplishment of outcomes. A post-implementation questionnaire will be applied to assess the actual outcomes resulting from the implementation of the program/unit as they relate to the perceived outcomes. Through reflection upon the students and teachers pre- and post-implementation questionnaires, qualitative observations of teachers and critical friends, and utilisation of triangulation methods, the researchers will be able to bring the different types of evidence into relationship with each other so that they can be compared and contrasted. The three points of the ‘Triangle’ are illustrated in Figure 4:

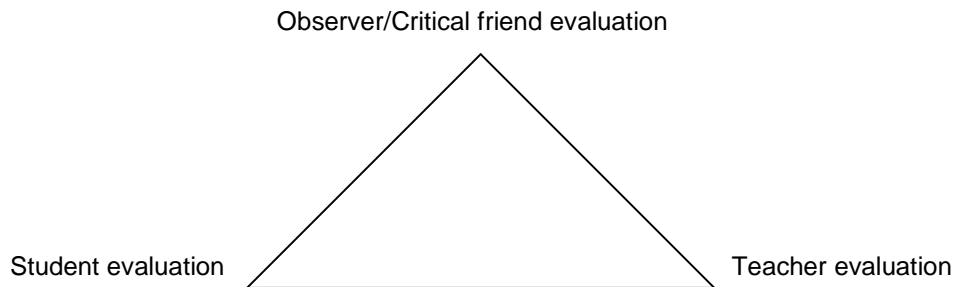


Figure 4: Triangulation of evaluation perspectives

Empowering Teachers and Students to Build Their Capacity for Change

Kates et al. (2001) assert that 'meeting fundamental human needs while preserving the life-support systems of planet earth is the essence of sustainable development. In the educational context, empowering teachers and students to meet their needs whilst ensuring the maintenance and integrity of global socio-ecological systems requires capacity building specifically related to achieving sustainability through learning. Such capacity building includes systems thinking and operationalising conceptual sustainability initiatives by moving beyond social learning to the practice of sustainability learning (Smith et al., 2007).

Building capacity for change often relies upon the perception that change will lead to a desired and/or preferred outcome. The decision to make movement towards change, whether physical or mental, can stem from an understanding of an action and its correlation with a desired outcome. For example, if a teacher perceives that a change to their teaching style will elicit a better response to curriculum from students and, therefore, an increase in learning outcomes achieved, the teacher may place emphasis upon changing their teaching style in order to achieve a preferred outcome for students. Similarly, if changing a learning experience to suit a particular student cohort results in more desirable outcomes, there is likelihood that the teacher will adapt activities accordingly. This correlation is important as it can be a determinant for the success that a transformative change for sustainability initiative may achieve. The perceived function of likelihood of change versus value of change can also act as an incentive or deterrent towards enacting change in the first place. It is important to note that values education isn't underpinned by scientific research, whereas, education for sustainability in many cases is.

'The issue is that learning (and the underpinning transformative change processes) is not a tangible concept and therefore we cannot actually see or show when it's happening (UNESCO Bangkok 2007a). In this case indicators can be used to show improvements in students (and teachers) knowledge and

skills (Elder, 2004). The development of an MEF that incorporates indicators, such as the ones discussed in the following section, is ultimately central to informing the process required for successful, perpetual capacity for change and empowerment.

Examining the function of Ecolect (Eco^l)

The MEF presented represents a novel means of qualifying and quantifying, through testing and measuring, the potential for successful outcomes to be generated through the implementation of transformative change for sustainability programs. One important component of the MEF is an analysis of an individual's capacity for transformative change for sustainability – we have defined this capacity as a person's Ecolect (Eco^l):

A person's tested and measured understanding of ecological, economic, social, and political factors, the interactions between these factors, and ensuing capacity for transformative change for sustainability.

It is envisioned that the Ecolect can be tested and measured by examining Ecolectual Quotient (Eco^Q) – a score derived from what will be standardized testing and measurement of key indicators attempting to capture Ecolect (Eco^l). Eco^Q scores could be shown to correlate with such factors: as water and energy saving, ecologically sustainable development, more sustainable decision-making, and a student's or teacher's developing Eco^Q. These scores could be used in many contexts: as predictors of environmental attitude and action or special needs; by social scientists who could study the distribution of Eco^Q scores in populations and the relationships between Eco^Q score and other variables; and, as predictors for ecologically sustainable development and/or transformative change.

A central tool of measurement for the Ecolectual Quotient is the Ecolectual Change Quadrant (Eco^{CQ}) which examines a person's Eco^l as being directly related to the value that they place on change, as well as their capacity to implement transformative change (Figure 5).

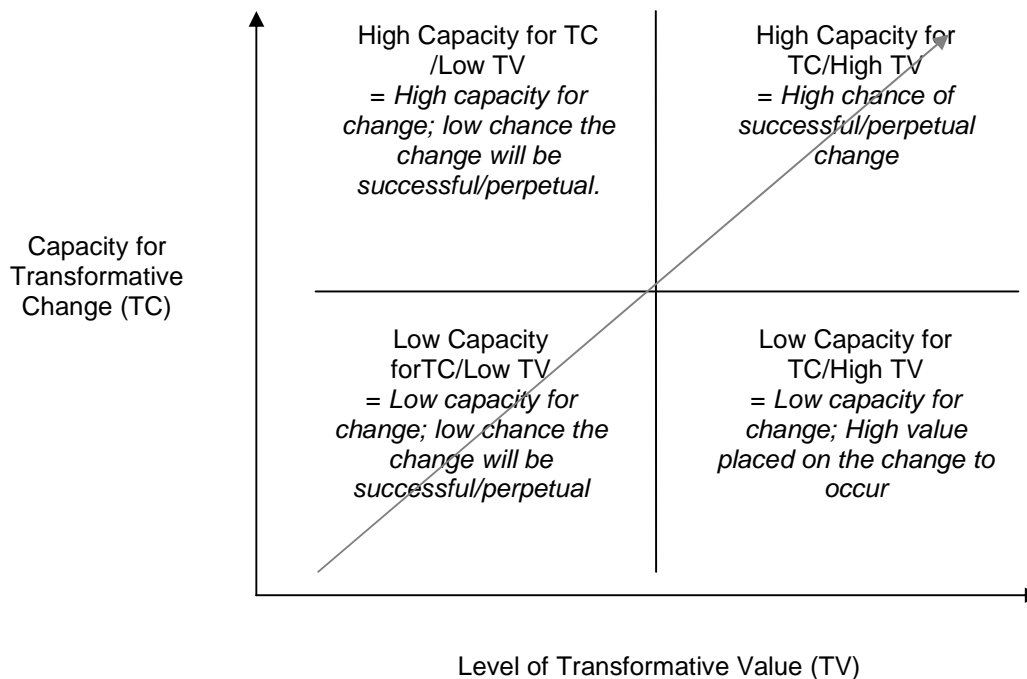


Figure 5: The Ecolectual Change Quadrant (Eco^{CQ})

Transformative Capacity (TC) is defined as:

The level of relevant knowledge, skills, resources and opportunities that an individual possesses in relation to the ability to perform sustainable behaviours.

Transformative Value (TV) is defined as:

The degree to which an individual values change towards sustainability.

Conclusion

In conclusion, it is important to reflect upon the 'futures perspective' embedded within transformative change for sustainability. 'The fundamental premise of futures thinking is that the future is not somewhere we are going, but something we are creating (Lowe, 2000)'. And, that the creation of this future is grounded in the process of change that leads to more sustainable education systems and an inherent capacity to influence a range of possible futures. The Monitoring and Evaluation Framework's potential to indicate a correlation of Transformative Capacity for Change (TC) to Transformative Value (TV) could be used as a predictor of the future success of EFS Programs, as a driver for selection of appropriate change strategies, and a tool to measure the perceived vs actual success of these strategies. Further research expanding upon the concept of Ecolect will examine the degree to which this correlation predicts successful

transformative change for sustainability and the development of key indicators that qualify and quantify this change. The monitoring and evaluation framework presented by the authors seeks to provide a structure through which to qualify the processes required for transformative change to occur. It is anticipated that, through further testing within the structure of a pilot project, the use of this framework may improve the depth of such processes and inform the development and refinement of future EfS programs.

In addition to equipping teaching professionals to make informed choices about the implementation of EfS through the development of holistic and systematic understandings of EfS systems, inherent is the focus on developing an attitude of sustainability learning; engaging students with philosophical and tangible opportunities to expand awareness of the field of ecology; increasing levels of individual responsibility and accountability; and, encouraging openness to the rapidly advancing nature of social, political, economic, and environmental issues. 'Our Capacity to become a sustainable society can only be achieved through education and education is the key to providing both awareness of the problem and, more importantly, the capacity to find solutions' (DETA, 2006). The monitoring and evaluation framework, presented within this paper in the early stages of development, will inform teachers and education professionals about the ability of EFS programs to successfully/unsuccessfully achieve outcomes that extend 'our capacity' for lasting and perpetual change required for a more sustainable future.

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